

## ***Diploma in Plant Identification, Utilization & Ethnomedicine***

<b><i>Diploma in Plant Identification, Utilization &amp; Ethnomedicine</i></b>		
Programme /Class: <b><i>Diploma in Plant Identification, Utilization &amp; Ethnomedicine</i></b>	Year: <b>II</b>	Semester: <b>III</b> <b>Paper-I</b>
Subject: <b>Botany</b>		
Course Code: <b>B040301T</b>	Course Title: <b>Flowering Plants Identification &amp; Aesthetic Characteristics</b>	
<p><b>Course outcomes:</b> After the completion of the course the students will be able to:</p> <ol style="list-style-type: none"> <li>1. To gain an understanding of the history and concepts underlying various approaches to plant taxonomy and classification.</li> <li>2. To learn the major patterns of diversity among plants, and the characters and types of data used to classify plants.</li> <li>3. To compare the different approaches to classification with regard to the analysis of data.</li> <li>4. To become familiar with major taxa and their identifying characteristics, and to develop in depth knowledge of the current taxonomy of a major plant family.</li> <li>5. To discover and use diverse taxonomic resources, reference materials, herbarium collections, publications.</li> <li>6. For the entrepreneur career in plants, one can establish a nursery, Start a landscaping business, Set up a farm Or Run a plantation consultancy firm</li> </ol>		
Credits: <b>4</b>	<b>Core Compulsory</b>	
Max. Marks: <b>25+75</b>	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): <b>4-0-0</b>		
Unit	Topic	No. of Lectures (60hrs)
<b>I</b>	<p><b>Taxonomic Resources &amp; Nomenclature</b> Components of taxonomy (identification, nomenclature, classification) ; Taxonomic resources: Herbarium- functions &amp; important herbaria, Botanical gardens, Flora, Keys- single access and multi-access. Principles and rules of Botanical Nomenclature according to ICN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).</p>	<b>7</b>
<b>II</b>	<p><b>Types of classification &amp; Evidences</b> Artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series) angiosperm phylogeny group (APG IV) classification. Introduction to taxonomic evidences from palynology, cytology, phytochemistry &amp; Molecular biology data (Protein and Nucleic acid homology).</p>	<b>8</b>
<b>III</b>	<p><b>Identification of Angiospermic families -I: (Families can be chosen University wise as per local available flora)</b> A study of the following families with emphasis on the morphological peculiarities and economic importance of its members (based on Bentham &amp; Hooker's system) Ranunculaceae, Malvaceae, Rutaceae, Fabaceae, Myrtaceae , Cucurbitaceae, Rubiaceae, Asteraceae, Apocynaceae, Acanthaceae, Asclepiadaceae, Solanaceae.</p>	<b>8</b>
<b>IV</b>	<p><b>Identification of Angiospermic families -II: (Families can be chosen University wise as per local available flora)</b> A study of the following families with emphasis on the morphological peculiarities and economic importance of its members (based on Bentham &amp; Hooker's system)- Amaranthaceae, Euphorbiaceae, Papaveraceae, Apiaceae, Lamiaceae, Orchidaceae, Liliaceae, Musaceae, Poaceae.</p>	<b>7</b>

V	<b>Modern trends in Plant taxonomy:</b> Brief idea on Phenetics, Biometrics, Cladistics (Monophyletic, polyphyletic and paraphyletic groups; Plesiomorphy and apomorphy).	8
VI	<b>TOOLS &amp; SOFTWARES IN PLANT IDENTIFICATION-</b> GIS ( Mapping of (i) Patterns(ii) Features (iii) Quantities 0P02.010H11YLIP - Free Phylogenetic Software, Digital Taxonomy (e-flora), Description Language for Taxonomy – DELTA Internet directory for botany.	7
VII	<b>Computer usage &amp; Android Applications</b> MS Office: PPT, Microsoft Excel, data entry, graphs, aggregate functions, formulas and functions, number systems, conversion devices, secondary storage media. GPS tagging, Plant Identification Apps.	7
VIII	<b>Aesthetic Characteristics of Plants:</b> Aesthetic characteristics of plants, English, Italian, French, Persian, Mughal and Japanese gardens; Features of a garden (Garden wall, Fencing, Steps, Hedge, Edging, Lawn, Trees, shrubs and shrubberies, climbers and creepers, rockery, Flower beds, Shrubbery, Borders, Water garden). Some Famous gardens of India. Conservatory, green houses, Indoor garden, Roof garden, Topiary, Bonsai.	8

**Suggested Readings:**

***Course Books published in Hindi may be prescribed by the Universities.***

1. <http://www.naace.co.uk/school-improvement/ict-mark/>
2. <https://www.socitm.gov.uk>, (2002) Learning in the 21st century Executive briefing A Socitm Insight publication, July 2002 Socitm.
3. Propagation And Nursery Management (hindi) (hb) ISBN : 9788177546200 Edition : 01 Year : 2016 Author : Pandey S.K. , Soni N. Publisher : Agrobios (India)
4. Dr. Amar Singh. पादपवर्गीकी- Plant Taxonomy (An Old and Rare Book) from the category Ayurveda in our Books collection. Uttar Pradesh Hindi Sansthan, Lucknow

1. Plant Systematics. Arun K. Pandey & Shruti Kansana. 2020. Jaya Publishing House.
2. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay.
3. Brandis, D. (1906) Indian Trees (London, 5th edition. 1971). International Book Distributors; Dehra Dun.
4. Dallwitz, M. J., Paine, T. A. and Zurcher, E. J. (2003). Principles of interactive keys. <http://delta-intkey.com>
5. <https://www.naace.co.uk/school-improvement/ict-mark/>
6. <https://www.socitm.gov.uk>, (2002) Learning in the 21st century Executive briefing A Socitm Insight publication, July 2002 Socitm.
7. K. B. Anjaria, (2015) "Electronic Herbarium and Digital Database Preparation of Common Trees of Anand District, Gujarat" MRP submitted to UGC, WRO, Pune 2015 (unpublished)
8. Lizeron Eremias and R. Subash. (2013) "E-Content Development: A Milestone In The Dynamic Progress Of E-Learning" International Journal of Teacher Educational Research (IJTER) Vol.2 No.1 January, 2013 ISSN: 2319- 4642
9. Pandey, B.P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi.
10. Stace, C. A. 1989. Plant Taxonomy and Biostatistics (2nd Ed.). Edward Arnold, London.
11. Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.
12. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
13. Davis, P. H. and V. H. Heywood. 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd, London.
14. Heywood, V. H. and D. M. Moore (Eds). 1984. Current Concepts in Plant Taxonomy. Academic Press, London.
15. Austin, R. 2002. Elements of planting design. New York: John Wiley & Sons.
16. Bertauski, T. 2005. Designing the landscape: An introductory guide for the landscape designer. Upper Saddle River, NJ: Pearson Prentice Hall.
17. Thomas, H., and S. Wooster. 2008. The complete planting design course: Plans and styles for every garden. London: Octopus Publishing Group.
18. Scarfone, S. 2007. Professional planting design: An architectural and horticultural approach for creating mixed bed plantings. New York: John Wiley & Sons.
19. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.

**This course can be opted as an elective by the students of the following subjects: Open to all but special for B.Sc. Biotech B.Sc. Forestry, B.Sc. Agriculture, B. Pharma, B.A. (Curators), B.A. Archaeology, B.A. Geology, BAMS**

**Suggested Continuous Evaluation Methods:**

Continuous Internal Evaluation shall be based on allotted Assignment and Class Tests. The marks shall be as follows:

Internal Assessment	Marks
Class Interaction	5
Quiz	5
Seminar	7
Assignment (Charts/ Flora/ Rural Service/ Technology Dissemination)	8
	25

**Course prerequisites:**

**Qualification:** To study this course, a student must have qualified 10+2 with Biology/ NSQF level 3 from Sector Skill Councils / Diploma holder from ITI in (Biology/ Agriculture/ Forestry).

**Facilities: Smart and Interactive Class**

**Other Requisites: : Video collection, Books, CDs, Flora, Herbarium, Access to On-line resources, Display Charts**

Suggested equivalent online courses:

<https://www.easybiologyclass.com/topic-botany/>

<http://egyankosh.ac.in/handle/123456789/53530>

<https://www.delta-intkey.com/www/desc.htm>

<https://milneorchid.weebly.com/plant-id-for-beginners.html>

<https://plants.usda.gov/classification.html>

[https://www.senecahs.org/pages/uploaded\\_files/Plant%20Classification.pdf](https://www.senecahs.org/pages/uploaded_files/Plant%20Classification.pdf)

[https://www.ladykeanecollege.edu.in/files/userfiles/file/Dr\\_%20S\\_%20Nongbri%20III%20Sem%20ppt.pdf](https://www.ladykeanecollege.edu.in/files/userfiles/file/Dr_%20S_%20Nongbri%20III%20Sem%20ppt.pdf)

[https://www.brainkart.com/article/Bentham-and-Hooker-s-classification-of-plants---Dicotyledonae.-Gymnospermae-and-Monocotyledonae\\_1000/](https://www.brainkart.com/article/Bentham-and-Hooker-s-classification-of-plants---Dicotyledonae.-Gymnospermae-and-Monocotyledonae_1000/)

<https://libguides.rutgers.edu/c.php?g=336690&p=2267037>

<https://www.delta-intkey.com/>

Programme/Class: : <b>Diploma in Plant Identification, Utilization &amp; Ethnomedicine</b>	Year: <b>II</b>	Semester: <b>III Paper-II (Practical)</b>
Subject: <b>Botany</b>		
Course Code: B040302P	Course Title: <b>Plant Identification technology</b>	
<p><b>Course outcomes:</b> After the completion of the course the students will be able:</p> <ol style="list-style-type: none"> <li>To learn how plant specimens are collected, documented, and curated for a permanent record.</li> <li>To observe, record, and employ plant morphological variation and the accompanying descriptive terminology.</li> <li>To gain experience with the various tools and means available to identify plants.</li> <li>To develop observational skills and field experience.</li> <li>To identify a taxonomically diverse array of native plants.</li> <li>To recognize common and major plant families.</li> <li>To Understand aesthetic characters of flowering plants by making-landscapes,gardens,bonsai,miniatures</li> <li>Comprehend the concepts of plant taxonomy and classification of Angiosperms.</li> </ol>		
Credits: <b>2</b>	<b>Core Compulsory</b>	
Max. Marks: <b>25+75</b>	Min. Passing Marks:	
Total No. of Lectures-Tutorials-Practical (in hours per week): <b>0-0-2</b>		
<b>Unit</b>	<b>Topic*</b> <b>*(Perform Any three experiments from each unit as per facility)</b>	<b>No. of Lecture (60Hrs)</b>
<b>I</b>	<p><b>Herbarium: Plant collecting, Preservation and Documentation:</b> Stepwise Practicing Herbarium techniques: a. FIELD EQUIPMENTS, Global Positioning System (GPS) instrument &amp; Collection of any wild 25 plant specimens b. Learn to handle Herbarium making tools c. Pressing and Drying of collected plant specimens d. Special treatments for all varied groups of plants e. Mount on standard herbarium sheets f. Label them using Standard method g. Organize them and give Index Register Number</p>	<b>7</b>
<b>II</b>	<p><b>Taxonomic Identification using plant structure</b> a. Classify 25 plants on the basis of Taxonomic description (Plant Morphology, Anatomy, Reproductive parts, Habit, adaptation anomalies) according to Bentham and Hooker natural system of classification in the following families: Malvaceae, Fabaceae (Papilionaceae), Solanaceae, Scrophulariaceae, Acanthaceae, Labiatae (Lamiaceae), Rubiaceae.</p>	<b>8</b>
<b>III</b>	<p><b>Identification during excursions</b> a. Conducting Spot identification (Binomial, Family) of common wild plants from families included in the theoretical syllabus (list to be provided) and making FIELD NOTE BOOK and filling Sample of a page of field-book, used in Botanical Survey of India.  b. Describe/compare flowers in semi-technical language giving V.S. of flowers, T.S. of ovaries, floral diagrams and Floral Formulae. Identify and assign them to their respective families giving reasons.</p>	<b>8</b>
<b>IV</b>	<b>COLLECTION, PRESERVATION AND STORAGE OF ALGAE, FUNGI BRYOPHYTES, PTERIDOPHYTES (Two each)</b>	<b>7</b>
<b>V</b>	<p><b>Botanical Nomenclature &amp; reporting Method:</b> a. Give nomenclature to collected plants as per ICN rules and prepare labels as per BSI b. <b>Author Citation, Effective Publication and Principle of Priority:</b> To show a specimen paper on Basic structure of a taxonomic Research published on a new species in taxonomic journal</p>	<b>7</b>
<b>VI</b>	<p><b>COMPUTERS</b> 1. Learning to use EXCEL Microsoft PowerPoint and Word., WORKING WITH FOLDER AND WINDOWS UTILITY., CREATE AND MANAGE FILES AND FOLDER TREE,</p>	<b>7</b>

	<p>2. Practice browsing different sites using search engines. practice and understand different E-Mail services – Outlook, Yahoo mail, rediffmail etc. Practice Creating E-Mail accounts, Sending, Receiving &amp; Storing of mails.</p> <p>3. Create and Participate in virtual conferencing in an interactive Zoom Meeting</p>	
<b>VII</b>	<p><b>Computer Application in taxonomy</b></p> <p>1. Use Taxonomic Softwares (Dichotomous Key)</p> <p>2. Practicals on Phylogenetic analysis</p> <p>3. Make line drawing of Plants for description</p> <p>4. Using of plant identification apps on android phones</p>	<b>8</b>
<b>VIII</b>	<p>1. Create a Bonsai of any plant</p> <p>2. Develop a miniature garden</p> <p>3. Draw Layouts of various types of gardens</p> <p>4. Plant Propagation methods practice</p>	<b>8</b>
<p><b>Suggested Readings:</b>  <b>Course Books published in Hindi may be prescribed by the Universities.</b></p> <p>1. Day, S.C. (2003) A Art of Miniature Plant Culture. - Agrobios. Jodhpur, India.</p> <p>2. Practical Taxonomy of Angiosperms By : R K Sinha ISBN : 9789386768520 I.K International Publishing House Pvt. Ltd.</p> <p>1. Day, S.C. (2003) Complete Home Gardening. (2003) Agrobios, Jodhpur, India.</p> <p>2. Dhopte, A.M. (2003) Principles and Techniques for Plant Scientists. - Agrobios, Jodhpur, India.</p> <p>3. Khan, M.R. (1995) Horticulture and Gardening. - Nirali Prakashan, Pune. India.</p> <p>4. Pramila Mehra Gardening for everyone-. Hind pocket book private limited, New Dehli.</p> <p>5. Kumarsen V. Horticulture, Saras Publication</p> <p>6. Ramesh Bangia Learning Computer Fundamentals.,., Khanna Book Publishers</p> <p>7. Bose T.K. &amp; Mukherjee, D., 1972, Gardening in India, Oxford &amp; IBH Publishing Co., New Delhi.</p> <p>8. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.</p> <p>9. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.</p> <p>10. Bole, P. V. and Vaghani, Y. (1986) Field guide to the common trees of India. Oxford University Press; Bombay.</p> <p>11. Womersley, J. S. 1981. Plant collecting and herbarium development: A manual.</p> <p>12. Brandis, D. (1906) Indian Trees (London, 5th edition. 1971). International Book Distributors; DehraDun</p> <p>13. Dallwitz, M. J., Paine, T. A. and Zurcher, E. J. (2003). Principles of interactive keys. <a href="http://delta-intkey.com">http://delta-intkey.com</a>  <a href="https://www.naace.co.uk/school-improvement/ict-mark/">https://www.naace.co.uk/school-improvement/ict-mark/</a></p> <p>14. Manilal, K. S. and M. S. Muktesh Kumar (ed.) (1998) A Hand book of Taxonomy Training, DST, N. Delhi</p> <p>15. Naik, V. N. (1984) Taxonomy of Angiosperms Tata McGraw-Hill Publication Com. Ltd., New Delhi</p> <p>16. Primak, R. B. (2004) A Primer of Conservation Biology. Sinauer Associates, Inc. Publishers</p> <p>17. Quicke, Donald, L. J. (1993) Principles and Techniques of Commemorative Taxonomy. Blakie, Academic and Professional, London</p> <p>18. Singh, G (2004) Plant Systematics: Theory and practice Oxford and YBH Publishing Co. Pvt. Ltd., New</p>		

	<p>Delhi.</p> <p>19. Bridson, D. &amp; L. Forman. eds. 1998. The Herbarium Handbook. 3rd ed. Royal Botanic Gardens, Kew (Reprinted 1999).</p> <p>20. De Vogel, E.F. 1987. Manual of Herbarium Taxonomy: Theory and Practice. UNESCO, Jakarta.</p> <p>21. Fosberg, F.R. &amp; M.-H. Sachet. 1965. Manual for tropical herbaria. Int. Bur. Pl. Tax. &amp; Nom., Regnum Vegetabile Vol. 39. Utrecht.</p> <p>22. Jain, S.K. &amp; R.R. Rao. 1977. A handbook of field and herbarium methods. Today &amp; Tomorrow's Printer and Publishers, New Delhi.</p> <p>23. Victor, J.E., M. Koekemoer, L. Fish, S.J. Smithies, M. Mossmer. 2004. Herbarium essentials: the Southern African Herbarium user manual. Southern African Botanical Diversity Network Report No. 25. SABONET, Pretoria.</p>										
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	<p><b>Course prerequisites:</b> <b>Qualification:</b> To study this course, a student must have qualified 10+2 with Biology/ NSQF level 3 from Sector Skill Councils / Diploma holder from ITI in (Biology/ Agriculture/ Forestry). <b>Facilities: Smart and Interactive Class</b> <b>Other Requisites: : Video collection, Books, CDs, Flora, Herbarium, Access to On-line resources, Display Charts</b> <b>Lab Requisites: Microscopes (Compound, Stereo) Dissection box, stain, Herbarium, Herbarium press, Dryers, Grinder, Reference Flora</b></p>										
	<p><b>Suggested equivalent online courses:</b></p> <ol style="list-style-type: none"> <li><a href="http://egyankosh.ac.in/bitstream/123456789/13096/1/Unit-5.pdf">http://egyankosh.ac.in/bitstream/123456789/13096/1/Unit-5.pdf</a></li> <li><a href="https://www.for.gov.bc.ca/hfd/pubs/docs/wp/wp18.pdf">https://www.for.gov.bc.ca/hfd/pubs/docs/wp/wp18.pdf</a></li> <li><a href="https://www.researchgate.net/publication/267510854_The_Flowering_Plants_Handbook">https://www.researchgate.net/publication/267510854_The_Flowering_Plants_Handbook</a></li> </ol> <p><b>Any Other :</b></p> <p><b>Botanical Excursions:</b> One teacher along with a batch not more than 7 students be taken for botanical excursion to places of Botanical interest, one in each term. If there are female students in a batch of 7 students, one additional lady teacher is permissible for excursion.</p> <p>Each excursion will not be more than SEVEN days during college working days. T.A. and D.A. for teachers and non-teaching staff participating in excursions should be paid as per rules. Tour report duly certified by tour in charge teacher and Head of the Department should be submitted at the time of practical examination. For every study tour take the prior permission of the head of the department and Principal.</p> <p>The marks will be counted under Internal assessment and external assessment both. In external assessment student will have to present his excursion report along with industrial training/central labs visits and BSI or Museum visits. In internal assessment he shall have to label the campus plants with botanical details/develop herbal/floristic garden/conserve plants in botanical garden/contribute specimens via collection .</p>										